

WHAT IS CLAIMED IS:

1. A bias potential generating apparatus for generating a plurality of potentials as bias potentials and generating each of the potentials by switching between a bias potential and a standby potential, comprising:
 - a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential; and
 - a drive control circuit for controlling the drive operation of the potential restoration circuit;wherein the potential restoration circuit is provided for each of the generated potential.
2. A bias potential generating apparatus according to claim 1,
 - wherein the drive control circuit controls the drive operation of the potential restoration circuit based on a pulse waveform signal, the drive control circuit including an oscillation circuit for generating a clock signal for generating the pulse waveform signal.
3. A bias potential generating apparatus according to claim 1, further comprising:
 - a drive time setting circuit for setting the drive time of the potential restoration circuit arbitrarily.
4. A bias potential generating apparatus according to claim 3,
 - wherein the drive control circuit controls the drive operation of the potential restoration circuit based on a pulse waveform signal; and
 - wherein the drive time setting circuit is a register for outputting a set value equal to the pulse width of the pulse waveform signal.
5. A bias potential generating apparatus according to claim 1, further comprising:

a current setting circuit for arbitrarily setting a restoration current used in the potential restoration circuit at the time of restoring the bias potential.

5 6. A bias potential generating apparatus according to claim 5,

wherein the potential restoration circuit is constituted by a plurality of MOS transistors connected in parallel to each other for generating the restoration current; and

10 wherein the current setting circuit supplies a conduction control signal individually to each of the plurality of the MOS transistors.

7. A bias potential generating apparatus according to claim 1,

15 wherein the potential restoration circuit includes a plurality of MOS transistors connected in series with each other for generating a threshold voltage by shorting the gate potential and the drain potential; and

20 wherein the restoration voltage of the potential restoration circuit used for restoring the bias potential can be set arbitrarily by changing the number of the MOS transistors.

8. A bias potential generating apparatus according to claim 1, further comprising:

25 a reference potential generating circuit for generating a reference potential having a potential equivalent to the bias potential;

30 wherein the drive control circuit drives the potential restoration circuit during the period when the generated potential fails to reach the reference potential, and stops driving the potential restoration circuit at the time point when the generated potential reaches the reference potential.

9. A bias potential generating apparatus according to claim 1, further comprising:

5 a restoration potential generating circuit for generating a restoration potential equivalent to the bias potential;

wherein the potential restoration circuit shorts the generated potential to the restoration potential at the time of restoring the potential.

10 10. A bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential, comprising:

a potential restoration circuit for restoring a generated potential from the standby potential to the bias potential;

15 a drive control circuit for controlling the drive operation of the potential restoration circuit; and

a drive time setting circuit for setting the drive time of the potential restoration circuit arbitrarily.

20 11. A bias potential generating apparatus according to claim 10,

wherein the drive control circuit controls the drive operation of the potential restoration circuit based on a pulse waveform signal; and

25 wherein the drive time setting circuit is constituted by a register for outputting a set value of the pulse width of the pulse waveform signal.

12. A bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential, comprising:

30 a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential;

a drive control circuit for controlling the drive

operation of the potential restoration circuit; and

a current setting circuit for arbitrarily setting the restoration current used in the potential restoration circuit at the time of restoring the potential.

5 13. A bias potential generating apparatus according to claim 12,

wherein the potential restoration circuit is constituted by a plurality of MOS transistors connected in parallel to each other for generating the restoration
10 current; and

wherein the current setting circuit supplies a conduction control signal individually to each of the MOS transistors.

14. A bias potential generating apparatus for
15 generating a potential by switching between a bias potential and a standby potential, comprising:

a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential; and

20 a drive control circuit for controlling the drive operation of the potential restoration circuit;

wherein the potential restoration circuit includes a plurality of MOS transistors connected in series with each other for generating a threshold voltage by shorting the
25 gate potential and the drain potential; and

wherein the restoration voltage used for restoring the bias potential can be arbitrarily set by changing the number of the MOS transistors of the potential restoration circuit.

30 15. A bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential, comprising:

a potential restoration circuit for restoring the

generated potential from the standby potential to the bias potential;

a drive control circuit for controlling the drive operation of the potential restoration circuit; and

5 a reference potential generating circuit for generating a reference potential equivalent to the bias potential;

wherein the drive control circuit drives the potential restoration circuit during the period when the generated potential fails to reach the reference potential, and stops driving the potential restoration circuit when the generated potential reaches the reference potential.

10 16. A bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential, comprising:

a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential; and

20 a restoration potential generating circuit for generating a restoration potential equivalent to the bias potential;

wherein the potential restoration circuit shorts the generated potential and the restoration potential at the time of restoring the bias potential.

25 17. A liquid crystal driving apparatus comprising:

a bias potential generating apparatus for generating a plurality of potentials as bias potentials and generating each potential by switching between a bias potential and a standby potential;

30 a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential; and

a drive control circuit for controlling the drive

operation of the potential restoration circuit;

wherein the potential restoration circuit is provided for each of the generated potentials.

18. A liquid crystal driving apparatus comprising:

5 a bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential;

a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential;

10 a drive control circuit for controlling the drive operation of the potential restoration circuit; and

a drive time setting circuit for setting the drive time of the potential restoration circuit arbitrarily.

15 19. A liquid crystal driving apparatus comprising:

a bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential;

20 a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential;

a drive control circuit for controlling the drive operation of the potential restoration circuit; and

25 a current setting circuit for arbitrarily setting the restoration current used in the potential restoration circuit at the time of restoring the potential.

20. A liquid crystal driving apparatus comprising:

30 a bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential;

a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential; and

a drive control circuit for controlling the drive operation of the potential restoration circuit;

wherein the potential restoration circuit includes a plurality of MOS transistors connected in series with each other for generating a threshold voltage by shorting the gate potential and the drain potential thereof; and

wherein the restoration voltage of the potential restoration circuit used for restoring the bias potential can be arbitrarily set by changing the number of the MOS transistors.

21. A liquid crystal driving apparatus comprising:

a bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential;

a potential restoration circuit for restoring the generated potential from the standby potential to the bias potential;

a drive control circuit for controlling the drive operation of the potential restoration circuit; and

a reference potential generating circuit for generating a reference potential equivalent to the bias potential;

wherein the drive control circuit drives the potential restoration circuit during the period when the generated potential fails to reach the reference potential and stops driving the potential restoration circuit when the generated potential reaches the reference potential.

22. A liquid crystal driving apparatus comprising:

a bias potential generating apparatus for generating a potential by switching between a bias potential and a standby potential;

a potential restoration circuit for restoring the generated potential from the standby potential to the bias

potential; and

a restoration potential generating circuit for generating a restoration potential equivalent to the bias potential;

5 wherein the potential restoration circuit shorts the generated potential to the restoration potential at the time of restoring the bias potential.